

REMARKS

Upon entry of this paper, claims 1–13 and 26–29 will be pending in this Application. Applicants have amended claim 26 and added new claim 29. Basis for the amendment to claim 26 and for new claim 29 may be found, for example, in the original claims and on pages 2–3 of the specification.

Applicants note with appreciation that the Examiner has concluded that claims 1–13 contain allowable subject matter and has allowed claims 1–13.

Rejection under 35 U.S.C. § 103(a)

Claims 26–28 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,399,303 to Connolly ("Connolly") in view of Heath et al. (*J. Phys. Chem. B* 1997, 101, 189–197) ("Heath"). The Examiner relies on *Connolly* to teach the fourth element of claim 26, namely, positioning a biological material to be in electrical communication with at least one layer of the electrical device to facilitate an electrical measurement that is affected by the biological material, wherein the biological material is selected from the group consisting of proteins, polypeptides, nucleic acids, polysaccharides, carbohydrates, enzyme substrates, antigens, antibodies, pharmaceuticals, and combinations thereof. The Examiner recognizes that with respect to claim 26, *Connolly* does not teach any of the first three elements, i.e., (a) providing a batch of nanoparticles having submicron sizes and an electrical characteristic; (b) depositing the nanoparticles onto a surface; and (c) sintering the batch of nanoparticles to form at least one layer of an electrical device. The Examiner relies on *Heath* for these three elements.

Connolly teaches methods and devices for detecting a target nucleic acid molecule. The target nucleic acid molecule, either by itself or as a support, is used to complete an electrical circuit. The presence of the target nucleic acid molecule is indicated by the ability to conduct an electrical signal through the circuit. See column 2, lines 24–27. *Connolly* does not teach the use of nanoparticles, nor does he teach any of the materials recited in amended claim 26, i.e., proteins, polypeptides, polysaccharides, carbohydrates, enzyme substrates, antigens, antibodies, and pharmaceuticals.

Heath, on the other hand, describes the phase behavior of certain nanocrystals. *Heath* does not teach sintering (heating) nanoparticles to form a layer of an electrical device, as required by independent claims 26 and 29. Rather, *Heath* teaches compressing particles to isothermically form various phases of a material. See *Heath*, p. 192, first paragraph. Compression results in the incorporation of ligands into the compressed layer. By contrast, sintering, as claimed herein, can drive off the ligands attached to the nanoparticles so they are *not* incorporated, resulting in a purer layer.

Accordingly, even if *Connolly* were combined with *Heath* as the Examiner proposes, the subject matter of amended claim 26 and new claim 29 still would not be realized; the references, alone or in combination, simply do not teach combining nanoparticles with biological material (as defined in amended claim 26 and new claim 29) in order to facilitate electrical measurements that are affected by the biological material. Furthermore, these references do not teach *sintering* nanoparticles to form a layer of an electrical device.

But we submit that the combination is, in any event, improper. Insofar as *Connolly* does not even mention nanoparticles, much less nanoparticles relevant to the claims herein, there exists no motivation to combine the reference with *Heath*. It is well-established that the motivation to combine two references must stem from *the references themselves*. See, e.g., MPEP § 706.02(j) ("The teaching or suggestion to make the claimed combination ... must ... be found in the prior art and not be based on applicant's disclosure"), citing *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

For these reasons, we respectfully submit that the rejection under 35 U.S.C. § 103(a) of independent claim 26 should not be maintained. Because claims 27–28 depend from claim 26 and include further limitations, Applicants submit that these claims are patentable over a combination of *Connolly* and *Heath*. Furthermore, Applicants submit that new independent claim 29 is patentable over *Connolly* and *Heath*, both alone and in combination, because these references do not teach or suggest the subject matter of claim 29, as described above. More specifically, the cited references do not teach or suggest combining nanoparticles with biological material in order to facilitate electrical measurements that are affected by the biological material, with the nanoparticles being sintered to form at least one layer of an electrical device.

MARKED-UP COPY OF AMENDED CLAIMS

26. (Amended) A method of fabricating a bioelectronic component, the method comprising the steps of:

- a. providing a batch of nanoparticles having submicron sizes and an electrical characteristic;
- b. depositing the nanoparticles onto a surface;
- c. sintering the batch of nanoparticles to form at least one layer of an electrical device; and
- d. positioning a biological material to be in electrical communication with at least one layer of said electrical device to facilitate an electrical measurement thereof, the electrical measurement being affected by the biological material, wherein the biological material is selected from the group consisting of proteins, polypeptides, [nucleic acids,]polysaccharides, carbohydrates, enzyme substrates, antigens, antibodies, pharmaceuticals, and combinations thereof.

CONCLUSION

In light of the foregoing, Applicants respectfully submit that all claims are now in condition for allowance.

Please charge any fee occasioned by this paper to our Deposit Account No. 20-0531.

Respectfully submitted,

Date: May 27, 2003
Reg. No. 44,381

Tel. No.: (617) 310-8327
Fax No.: (617) 248-7100

Natasha C. Us
Natasha C. Us
Attorney for the Applicant
Testa, Hurwitz, & Thibeault, LLP
High Street Tower
125 High Street
Boston, Massachusetts 02110

2617702-1